

The larvae under observation entered yet another stage before pupating, the period elapsing between the last two changes being for some reason, possibly that of faulty feeding, very variable. The length now from 26 to 30 mm., the head yet larger but with the same markings. Head somewhat darker in colour, the V very dark brown, surface of head punctiform and the lower or "cheek" spots having five small pimples on their edges, four on the inner edge, the upper one at the apex and the lower one just below the half way, the fifth pimple on the outer side in line with the lower on the inside. Segmental fold to first thoracic, black. First thoracic reddish with a black shiny collar over dorsum extending about half way down over lateral area. Remainder of larva at first greenish khaki, a colouring that later gives way to a pinkish, almost mauve, colouring as the larva draws near to the time for pupation. The larva is covered somewhat closely with small, irregular, slightly raised, black spots. The upper lateral line formerly yellow now deep red-orange. Prolegs on first thoracic deep red whilst those on the other two thoracic segments as also the thoracic underside, orange-red. Remainder of underside lighter orange. Dorsally on the fifth abdominal a yellowish orange flush.

The orthodox tubercles as also the spiracles are very poorly defined and I was quite unable to find them with the magnifying power at my disposal, the larva examined being a spirit specimen after 24 hours immersion in 80% alcohol.

The full period of the larval state varied considerably, as I have mentioned above, but the period for those specimens that first pupated was 38 days. The larva reached a final length of 40 mm., pupating on the side of the breeding cage in a pupa covered with whitish "bloom." Emergence took place nine days after pupation, between nine o'clock and midday. Lack of time prevented my describing the pupa, a lapse which must be rectified next season.

Specimens have been forwarded to B.M. Nat. Hist under the following numbers. Eggs No. 6911. Larva No. 7039. (Unfortunately this specimen has shrunk to about half its size in the spirit). Empty pupae cases No. 7038. Imagines No. 7035. Foodplant. *Rhynchosia senna*, Gill. (*Leguminosae*), known locally as "Sen del zorro" (Fox senna).

Zygaenae, Grypocera and Rhopalocera of the Cottian Alps compared with other races.

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(Continued from Vol. XXXVIII., p. 176.)

Coenonympha arcania exerge arcania, L., race *parrinsubrica*, Vrtj. :—Oulx (end of June to mid-July, on the hedges of a shady path). Exerge *gardetta*, de Prun., = *phileca*, Hb. = *satyrion*, Esp., race *gardetta*, de Prun. : Clavières, on damp, grassy slopes; Sestrières, on peat-bog.

Coenonympha iphis race *bertolis*, de Prun. :—Sestrières, in company with preceding. De Prunner's description unmistakably refers to this species and the locality is "Castrum Delphinum." His name thus has more than a century of priority over that of *belisaria* given in 1910 by Oberthür (*Ét. Lép. Comp.*, IV., p. 17) to the same race from La

Grave (Hautes Alpes). Also *subalpina*, Reutti., of Baden, and *carpathica*, Horm., are based on descriptions, which afford no differential characters from *bertolis*. Considering the large number of striking races which have been neglected in other species, it is queer how this one has been favoured, whereas it varies geographically very little. The nymotypical race of Vienna is found as far south as Rome and *bertolis* is, more or less, that of all the mountain ranges of Western Europe. Form *anavayoras*, Assm., is an intermediate one, often prevalent in Central Europe. Race *anavarete*, Frhst., is a larger and less melanic form of *bertolis*, from the Moulinet, near Mentone, and *ecommatica*, Rebel., is a prominently marked one of nymotypical *iphis*, from Istria, but it seems to occur individually also elsewhere, because I have a Vienna specimen answering Rebel's description.

Aphantopus hyperantus race *rufilius*, Frhst.:—Oulx, by the lake (July 23rd). Intermediate in size between the small nymotypical *hyperantus* of Sweden and the giant race *maxima*, Vrty., described from Turin, it is a little smaller than true *rufilius* of S. Tyrol, but quite like it by the warm, saturated tone of underside.

Hyponephele lycaon race *lycosura*, Frhst.:—Oulx and Cesana (males from about the 7th of July: females from the 17th and a few still emerging at the beginning of August). I think I can safely refer this race to *lycosura* of the Maritime Alps, although Frühstorfer's descriptions are most confusing. The race of Oulx is similar to the one I have collected at the Baths of Valdieri in the Maritime Alps, from which it only differs in never producing the extreme *permagnocellata*, Trti. and Vrty., form of the female, with ocelli of a size never attained in any other race, except the Spanish *macrophthalma*, Frhst. At Oulx, as well as at Valdieri, however, the ocelli are on an average larger than in the nymotypical *lycaon* of northern Germany; they, notwithstanding, never exhibit the minute white pupil seen in the latter and the base of the wing is in most females much more broadly patched with fulvous; otherwise they both resemble very much nymotypical *lycaon*. The race I have from Zermatt and from Austria and which should be *ephisius*, Frhst., differs most strikingly from the latter by its much smaller size, frailer build, thinner scaling, lighter colouring on both surfaces and very broadly fulvous female, but Frühstorfer's description conveys nothing of the sort and Vorbrod't's is more like it, but not complete. The "type" of *ephisius* is from Courmayeur; presumably Zermatt must have been included by mistake in its habitat; its race is quite different and should be distinguished by another designation: **degener**, mihi.

Epinephele jurtina race *phormia*, Frhst.:—Oulx and Cesana (males already abundant at the end of June; females appeared at the beginning of July, but the mass only in August and freshly emerged ones were still met with on the 16th). The race is the large and brightly coloured one of the warmer valleys of the Alps, often producing the broadly fulvous female, which has been credited with the name of *hispulla*, Esp., in all the catalogues of that region, although there has never existed a specimen like the real *hispulla* of Portugal amongst them. The name of *subhispulla*, Strand (*Entom. Zeitschr.*, XXV., p. 254, 1912) is perhaps the right one to use for them, although the "type" is from Holland and may be less marked.

Erebia ligea race unknown:—Monfol—1600m. above Oulx (one female on August 15th).

Subspecies *philomela* race *etobyma*, Frhst.?:—Cesana (one fresh male on July 15th). It may belong to this race of the Maritime Alps, but it does not exhibit its broad red brown band nor its large eye-spots to their full extent, so that it points to the race of the Valais; this, however, occurs individually also in the Maritime Alps and it is impossible to judge of the race from one specimen.

E. epiphron race *cydarnus*, Frhst.:—Clavières (males all worn, females emerging on July 29th); Sestrières (one worn male on August 8th). This race agrees with the one of the Baths of Valdieri in the Maritime Alps and with Fröhstorfer's description from the mountains near Mentone.

E. melampus race unknown:—One male above Oulx, with the following.

E. ceto race *ceto*, Hüb.:—Along the mule-path from Jouvenceau to Notre Dame des Broussailles, 1400m., above Oulx (both sexes emerging on July 2nd). Similar to the nymotypical race of the Valais, and thus different from the three very distinct races which surround it: *tyrsus*, Frhst., in the Upper Aosta Valley, *frenus*, Frhst., at very high altitudes to the west, in France, and *etra*, Frhst., to the south, in the Maritime Alps. With *obscura*, Rätz, from the Laquintal, etc., they make no less than five striking races in the Western Alps, and the series of specimens in my collection fully confirm their distinctness.

E. tyndarus race **subcassioides**, mihi:—Sestrières, on peat-bog (both sexes emerging on August 8th); one fresh male at Oulx on August 12th which resembles *cleo*, Hb., by the nearly uniformly grey underside of hindwings, with a bright silvery gloss, but of a much darker tone of grey, with markings less effaced, an insect of smaller size: **paracleo**, mihi. Reverdin in his interesting paper (*Bull. Soc. Lépid. Genève*, I., June, 1908) on this species has pointed out that there exist two very distinct geographical forms, which are never found together; he states that even intermediate individuals are scarcely ever found. As compared with the generality of geographical variations in most species this remark is certainly worth making, because as a rule it is quite true that the local races of *tyndarus* fall quite distinctly either in the nymotypical *tyndarus* group or in the *cassioides* one, but intermediate individuals do occur and it will probably be found that even intermediate races are not too rare. The one I have collected at the altitude of 2035m., at Sestrières, affords a good example to record, and Oberthür records frequent transitions at Lanslebourg, in Savoy (*Ét. Lépid. Comp.*, III., p. 340). It is important to take note of their existence in connection with the question which will have to be settled as to whether the species has divided into two groups bearing different hereditary factors, or "exerges," or whether its variations are all simple races, only differing in aspect owing to the effects of local conditions during individual development. For the present this seems to be the case, because these transitions exist, because the two forms are distributed together, though locally separate, in all the Alpine area (whilst exerges are seen to inhabit different areas, only blending on the boundary between them), and finally because the two constitute together one series of variations, of which *tyndarus* covers the lesser and *cassioides* the greater degrees of development of the ocelli and other

features. Taken as a whole, the Sestrières race gives the impression of being a *cassioides* of small size and with unusually small ocelli, but many individuals have the wings more rounded in shape, as in *tyndarus* proper, and the underside is always of the darkly sprinkled, and dull grey type. I have a specimen of the same sort from 1900m. on Mount Spinale, in the Trent district. No doubt it is racial also there, just as the other races *aquitania*, Frhst., described from the Col di Tenda, *carmenta*, Frhst., from Courmayeur, nymotypical *cassioides*, Hohenw., from Pasterze in Upper Carinthia, *paracleo*. Vrty., of Oulx, *cleo*, Hüb., from the Tyrol, *murina*, Rev., from the Moléson in the Fribourg canton, which are, more or less, successive grades leading from *subcassioides* to the most extreme *cassioides* type of structure and pattern, constitute local races by keeping remarkably true to their grade in each locality, but are found in such conditions dotted about over most of the Alpine region.

E. neoridas race *epineoridas*, Trti. :—Oulx (first male on Aug. 3rd and then soon abundant: first females on Aug. 15th, so that with those of *N. statilinus* and with *P. megera*, they were the last Rhopalocera to appear). This race is noteworthy, because it is a giant as compared with *nicochares*, Frhst., of the Maritime Alps, and to all the other races, in the same way that at the foot of the Susa Valley one finds the largest known race of *E. aethiops*: *taurinorum*, Vrty. It might seem rather strange that *neoridas* should produce its most flourishing race in the very locality where no other *Erebia*, except *tyndarus*, seems capable of existing. The explanation probably is that these two species emerge and oviposit later than the others and are at the chrysalid and imago stages during the long summer drought, which is a feature of the Susa Valley, whereas the next generation of the other *Erebia*, at that time, has already emerged from the ova and the very young larvae need sprouts of grass, which do not exist at Oulx till later in the season.

Melanargia galathea race **pedemontii**, mihi. :—Oulx (males already abundant at the end of June; females from July 13th, and still emerging at the beginning of August). For some years after I had first seen the descriptions by Frühstorfer of numerous races of this species I confess I was considerably sceptic as to whether they were really distinct and their features could thus be fixed and defined. I set to work to procure series of specimens of each to ascertain the truth about them. The result was what I usually have found it to be in similar cases of hasty criticism: the man who has done the work with the proper materials before him is perfectly right and it is only ignorance on the part of others that makes them doubt it, and hinders progress in the knowledge of facts by false preconceptions, sustained by a lazy tendency to shrink from the effort of facing new complexities. Having made this effort, I found that the characteristics pointed out by Frühstorfer are perfectly correct and that one can summarise the geographical variation in the Alpine region as follows: In the Jura there is a race transitional between nymotypical *galathea* of Germany and the dwarf *pygmaea* of the Geneva district; in the Valais, at low altitudes, one finds the much larger *nerens* with more elongated wings; on the French watershed of the Western Alps race *doris* spreads from the Isère (Allevard) to the Basses Alpes (Digne). These races all belong to the nymotypical Group by the thin streaks and the light grey suffusion of underside. We next come to the large southern

Group with broader black markings above and thicker streaks and darker suffusion on underside, which consists of several races, all included, till Frühstorfer began distinguishing them, under the sweeping name of *procida*, Herbst. It seems hopeless to try and establish where the specimen originally so named came from, "Italy" being the only locality mentioned. Frühstorfer supposes the little Island of Procida is the most likely, but it seems more reasonable to make use of the term for the dark individual form of any race in which it may occur. In the Alpes Maritimes and in the Var one meets with the superb race described by Oberthür from la Turbie, figured as *procida* by Seitz, pl. 38, and named *akis* by Frühstorfer. On the southern watershed of the Simplon and in northern Tessin flies the handsome *florina*, which I have collected also at Vanzone, 700m., in the Anzasca Valley; I notice one of its peculiarities is the elongated shape of the wings in the male, as in *nerens*. In southern Tessin it is replaced by the smaller and darker *arogna*, with shorter, rounder wings; I have found it at Premeno, 800m. above lake Maggiore and at Montevecchio, 450m. on the last hills of the Brianza, in Lombardy. Finally on the eastern watershed of the Western Alps I have from Oulx, from Turin and from the Baths of Valdieri a race, which stands nearest to *arogna*, but which differs from it by its much greater sexual dimorphism: the males are rather smaller, the females, on an average, considerably larger; the females in many individuals exhibit a larger extent of blackish suffusion at the base of the wings, but, on the other hand, the marginal black band is very often broken by a complete row of white premarginal spaces; this feature is very prominent also in the females of *akis*, making it contrast sharply with its male. In the Eastern Alps *sakaria* of the low valleys of S. Tyrol belongs to the nymotypical Group and, in fact, is very much like *nerens*; the much smaller, but otherwise similar, race of high altitudes, which I have collected at the Mendola Pass and at Klobenstein, might be distinguished by the name of **microsakaria**, mihi. Specimens I have from Vetriolo 1500m. above Levico, are identical with my *microprocida* of S. Italy (*Ent. Rev.*, 1919, p. 125). From S. Stefano di Cadore, 900m., in the Carnic Alps, to the Carso, 300m. above Trieste, I have constantly met with exactly the same race *elriva*, with very marked *procida* features, described from Gorizia. From Wippach eastward there exists the most melanic race of the species: *tenebrosa*, described from Laibach. (Frühstorfer's descriptions of the races mentioned above are in the *Ent. Zeit.*, 1910, p. 240; in *Soc. Entom.* XXXI. (1916) n. 7, p. 33, in the *Archiv Naturg.*, 82 (1916), 2, p. 19 and 86 (1921), 9, p. 109.)

Satyrus megera race *viridior*, Vrtý. :—Oulx (the first males appeared on Aug. 17th, when I left the locality). No doubt the first generation *megera*, L., had been on the wing at the end of the spring and the second only emerges when the summer period of drought is over. The same phenomenon occurs in particularly hot and dry localities even further south, whereas there, in less dry ones, in which the grass is kept green by moisture in the soil, another generation is produced at the beginning of the summer, the first being then much earlier than at Oulx.

*See: R. Verity, "A Systematic Index of the races of Palearctic *Rhopalocera* described by H. Frühstorfer" in the "Archiv für Naturgeschichte," 91 (1925), Abt. A.9. Heft.